COMMONWEALTH OF AUSTRALIA

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Warning

CHARLES DARWIN UNIVERSITY

Family Name	
Given Names	
Student Number	
Teaching Period	Semester 2, 2016

FINAL EXAMINATION	**DURATION**
PHA312 – Infectious Diseases	Reading Time: **10** minutes Writing Time: **180** minutes

INSTRUCTIONS TO CANDIDATES

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a RESTRICTED OPEN BOOK examination

Any non-programmable calculator is permitted

No handwritten notes are permitted

Any hard copy, unannotated English dictionary is permitted

ADDITIONAL AUTHORISED MATERIALS	**EXAMINATION MATERIALS TO BE SUPPLIED**
Australian Medications Handbook, un annotated, highlight and flagging is allowed	1 x 8 Page Book 1 x 20 Page Book 1 x Scrap Paper

THIS EXAMINATION IS PRINTED DOUBLE-SIDED.

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Section A

Short Essay Questions

Total number of Marks for this section: 75 marks

This section should be answered in the Answer Booklet provided.

Answer any FIVE of the SEVEN questions

Marks for each question are indicated. Suggested Time allocation for Section A: 90 minutes

Question A1

Describe and compare these two infections: endocarditis and pericarditis

Your description should include the definition, pathogenesis & likely causative pathogens, risk factors that predispose an individual to these infections, prognosis and key management principles.

(Marks 15)

Question A2

Briefly discuss any **THREE** of the following antimicrobial agents:

- Dicloxacillin
- Ciprofloxacin
- Ticarcillin
- Amphotericin B

(Your discussion should include the mode of action, spectrum of antimicrobial activity and any other factors which need to be considered while using the agent.)

(Marks 5 + 5 + 5 = 15)

Question A3

Briefly discuss the resistance mechanisms used by microorganisms against any **THREE** of the following antimicrobial agents.

Your discussion should include the resistance mechanism(s) that microorganisms have developed against each of the agents, and the clinical importance of preventing the increase in resistance against each of the agents.

- Benzylpenicillin
- Clarithromycin
- Trimethoprim
- Gentamicin

(Marks 5 + 5 + 5 = 15)

Question A4

a) Briefly discuss the pathogenesis of hospital acquired pneumonia.

b) Outline the important principles for identifying the causative pathogen(s) in osteomyelitis. Suggest a first line empirical regimen for osteomyelitis, and justify your choice.

(Marks 7 + 8 = 15)

Question A5

Briefly discuss the significance of any **TWO** of the following infections:

- Tuberculosis
- Chlamydia
- Malaria

(Your discussion should include pathogenesis, presentation, clinical and social significance, if applicable.)

(Marks 7.5 + 7.5 = 15)

Question A6

Briefly discuss the infectious disease community acquired pneumonia in the Darwin region.

Your discussion should include the definition, pathogenesis & likely causative pathogens, risk factors that predispose an individual to these infections, prognosis and key management principles

(Marks = 15)

Question A7

a) Discuss the factors that can contribute or predispose an individual to the development of cellulitis.

b) Discuss the common organism(s) that is associated with cellulitis, and the first line empirical therapy for its treatment. (Your discussion should also include any important considerations when treating cellulitis)

(Marks 7 + 8 = 15)

END OF SECTION A

Section B

Case Study Based Questions

Total number of Marks for this section: 75 marks

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section B: 90 minutes

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Question B1

Mr TF is a 72-year old male with a medical history of cardiovascular diseases (hypertension, high cholesterol, and a mild stroke 4 years ago) and arthritis, but he is otherwise relatively healthy and independent for all personal activities of daily living. His current regular medications include ramipril, low dose aspirin, atorvastatin, paracetamol and tramadol.

Mr TF has been experiencing influenza-like symptoms and feeling generally unwell for about a week prior to presentation, with difficulty in breathing. He has a non-productive cough and describes pain in his chest, both front and back, which he thinks may be due to a recent injury to his chest.

On examination, he is found to be moderately dehydrated. Physical examination and chest X-ray (CXR) show evidence of right upper lobe consolidation but the remainder of the chest is clear.

BP = 118/63, HR 90 bpm, RR 18 breath/min, temperature 37.4°C, SatO2 87%

RCC 4.05, Plt 168, WCC 14.2, neutrophil 11.90, Lymphocytes 0.65, Monocytes

0.13; Na 134, K 3.6, eGFR 37, CRP 280

A sputum sample is collected and sent for MCS testing. Preliminary results indicated a mixed growth of polymorphs and normal oral flora. A second sputum sample was ordered.

Mr TF is diagnosed with community acquired pneumonia.

Questions

A. Discuss the presenting symptoms and findings in Mr TF that confirm or associate with the diagnosis of community acquired pneumonia? Briefly discuss the significant/ severity of the condition in Mr TF based on information currently available.

(Marks 5 + 2)

B. Identify and briefly describe THREE pathogens that are most commonly associated with community acquired pneumonia in patients such as Mr TF.

(Marks 3)

C. Briefly describe the pathogenesis of community acquired pneumonia in Mr TF. (Your discussion should include the development of infection, risk factor found in Mr TF and prognosis of the condition)

(Marks 5)

D. What empirical therapy would you recommend for the treatment of Mr TF? (Your answer should also include the rationale for your recommendation and any specific consideration(s).)

(Marks 10)

(Total mark = 25 marks)

Question B2

B2 - Part 1

Mrs UC is a 63-year old female with Australian background and lives with her daughter. Mrs UC is a smoker, and was diagnosed with Type II Diabetes Mellitus (2010) and GORD. Her regular medications include metformin 1 g daily, aspirin 100 mg daily, omeprazole 20 mg daily, and perindopril 2.5 mg daily. Mrs UC is allergic to penicillin, which can cause a severe rash and laryngeal oedema to develop if she is exposed to chemically related agents.

Mrs UC visits her GP after experiencing difficulties in passing urine. She describes the symptoms as pain during urination (dysuria) and lower abdominal pain. She also describes having loose stool (or mild diarrhoea) for the past 2 days.

On examination, Mrs UC is alert and afebrile. Chest examination is clear, and there is no abdominal mass or tenderness.

BP = 134/78, HR 81 bpm
Urine test: sample is cloudy, protein +1, nitrite +ve, pH 7.1, WCC 104, RCC -ve
Blood and urine samples are collected and sent for MCS.
Mrs UC is diagnosed with cystitis and empirical antibiotic therapy is initiated with cephalexin.

Questions

A. Discuss the presenting symptoms and examination findings that suggest Mrs UC may have cystitis. Use the given information to draw conclusions about the diagnosis, severity and nature of her condition.

(Marks 5)

B. Outline a management plan that you would recommend for Mrs UC. (Explain the rationale behind the empirical therapy that was initiated; why was cephalexin selected? Was this a good choice? What is the risk of cross-reactivity?

(Marks 10)

B2 - Part 2

Mrs UC developed an anaphylactic reaction within an hour of taking the treatment for her UTI (treatment you have recommended in Question B2-B). She is treated by paramedics before she is transferred to the hospital for further treatment and observation.

Question

C. After the incident, what antimicrobial therapy would you recommend for the treatment of Mrs UC's UTI?

(Your answer should also include the rationale for your recommendation and any specific consideration(s).)

(Marks: 10)

(Total: 25 marks)

Question B3

B3 – Part 1

Mr SA is a 68 years old Aboriginal male presented to his local hospital with an infected right heel. Mr SA has a medical history of type II DM, hypertension and chronic kidney disease. According to his GP's referral letter, the infection started after he was bitten by an unknown insect about a week ago, and the bite wound did not improve after a course of oral antibiotics therapy (dicloxacillin).

Surgical drainage of the pus and debridement was performed on the next day (on 22nd October 2016), and samples were sent for MCS test. Intravenous empirical antibiotic (piperacillin + tazobactam) were initiated.

Question

A. Discuss the pathogenesis of Mr SA's wound infection, and comment on the antibiotics used.

(Your discussion should include the development of the infection, risk factors and prognosis of the infection.)

(Marks: 10)

B3 – Part 2

One day after the surgery, the MCS result has become available: Organism: Staphylococcus aureus +++

Amoxicillin/Clavulanic acid	R
Clindamycin	I
Cephalotin	R
Flucloxacillin	R
Rifampicin	S
Ticarcillin	I
Vancomycin	S

Susceptibilities (S = susceptible; R = resistant; I = intermediate; N = not performed)

The doctor decided to change Mr SA's antibiotic therapy to iv vancomycin 2 g daily, with a target trough level of 10-15 mcg/mL. Three days after the initiation of new antibiotic, his pre-dose vancomycin level and other test results are:

Date	26/07	22/07	04/03	01/03	18/02
Cr (umol/L)	123	93	98	84	106
eGFR	51	70	66	79	60
ALT	19				22
Vancomycin (mcg/mL)	18				

Question

B. Taking his condition into consideration and the laboratory findings, what would be your recommendation regarding the vancomycin use in Mr SA? Justify your recommendation and outline any additional monitoring that may be required. (Mr SA is about 162 cm tall and weighs 61 kg)

(Marks 15)

(Total: 25 marks)

END OF SECTION B

Reference ranges for laboratory tests

(Slight variations exist among laboratory due to the method of analysis)

Urea and electrolytes (U&E)		
Na	135.0-145.0	mmol/L
K	3.50-4.50	mmol/L (plasma)
	3.8-4.9	mmol/L (serum)
Cl	95-110	mmol/L
HCO_3^-	22-32	mmol/L
Urea	3.8-8.0	mmol/L
Creatinine	60-100	mmol/L
eGFR	> 90 mL/min/1.73 m^2	
Full blood examination (FBE)		
Hb	135-185	g/L (male)
	115-165	g/L (female)
RCC	4.50-6.50	($x10^{12}$ /L)
Haematocrit	0.40-0.54	%
MCV	78.0-100.0	fL
RDW	11.5-14.5	%
Platelets (Plt)	150-450	($x10^9$ /L)
WCC	4.0-11.0	($x10^9$/L)
Neutrophil	2.0-7.5	($x10^9$ /L) OR 40-80%
Lymphocytes	1.5-4.0	($x10^9$ /L) OR 20-40%
Monocytes	0.2-0.8	($x10^9$ /L) OR 2-10%
Eosinophils	0.0-0.4	($x10^9$ /L) OR 1-6%
Basophils	0.0-0.1	($x10^9$ /L) OR <2%
Liver function tests (LFT)		
ALP	20-100	U/L
AST	<40	U/L
ALT	<35	U/L
GGT	<50	U/L
Total bilirubin	0-20	umol/L
Total protein	61-84	g/L
Alb	35-45	g/L
Creatine Kinase (CK)	60-220	U/L (male)
	30-180	U/L
(female) CRP	<3 mg/L	